

Viscoelastic Surfactant Fluids Stable at High Brine Concentrations

Technical Field of the Invention

5 [0001] This application is a Continuation-in-Part of U.S. patent application number 09/667,073 which was filed on September 21, 2000 ^{now abandoned} which is incorporated by reference in its entirety.

[0002] This invention relates to the drilling, completion, and stimulation of hydrocarbon wells and in particular to fluids and methods for gravel packing, cleanup or drilling in a subterranean formation.

Background of the Invention

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[0003] Viscous fluids play many important roles in oilfield service applications. The viscosity of the fluids allows them to carry particles from one region of the formation, the wellbore, or the surface equipment to another. For instance, one of the functions of a drilling fluid is to carry drilling cuttings from around the drilling bit out of the wellbore to the surface. Fluid viscosity also plays an essential role for instance in gravel packing placement. Gravel packing essentially consists of placing a gravel pack around the perimeter of a wellbore across the production zone to minimize sand production from highly permeable formations.

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[0004] Solid suspension properties are also an important requirement for fracturing fluids. For a well to produce hydrocarbons from a subterranean geologic formation, the hydrocarbons have to follow a sufficiently unimpeded flow path from the reservoir to the wellbore. If the formation has relatively low permeability, either naturally or through formation damages resulting for example from addition of treatment fluids or the formation of scales, it can be fractured to increase the permeability. Fracturing involves literally breaking a portion of the surrounding strata, by injecting a fluid directed at the face of the geologic formation, at pressures sufficient to initiate and/or extend a fracture in the formation. A fracturing fluid typically comprises a proppant, such as ceramic beads or sand to hold the fracture open after the pressure is released. It is therefore important for the fluid to be viscous enough to carry the proppant into the fracture.

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[0005] The fluid viscosity is most commonly obtained by adding water-soluble polymers, such as polysaccharide derivatives. Recently, viscoelastic surfactants have been used as thickeners.